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(54)[TITLE OF THE INVENTION]
Consumable-electrode type gas-shielded-arc-welding apparatus

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[SPECIFICATION]

[TITLE OF THE INVENTION]

Consumable-electrode type gas-shielded-arc-welding apparatus

[CLAIMS]

(1) Motor which supplies filler core wire and which can carry out forward/reverse rotation, starting power source of constant current characteristic switched on between the above-mentioned filler core wire and welded base material at the time of arc starting, detector which detects short circuit of the above-mentioned filler core wire and the above-mentioned welded base material, and arc generating, controlled source which the above-mentioned motor is reversed by short-circuit detection of this detector, and is right-rotated by arc generating detection, welding source of constant voltage characteristic switched on by arc generating detection of the above-mentioned detector between the above-mentioned filler core wire and the above-mentioned welded base material.

Consumable-electrode type gas-shielded-arc-welding apparatus characterized by having the above.

(2) Starting power source and welding source are connected to juxtaposing between filler core wire and welded base material.

Consumable-electrode type gas-shielded-arc-welding apparatus of Claim 1 characterized by the above-mentioned.

[DETAILED DESCRIPTION OF THE INVENTION] This invention relates to consumable-electrode type gas-shielded-arc-welding apparatus, especially welding apparatus which can prevent generating of spatter at the time of arc starting.

FIG. 1 is connection diagram showing conventional MIG and MAG etc. consumable-electrode type gas-shielded-arc-welding apparatus, in the figure, (1) is shield nozzle, (2) is contact tip prepared in this shield nozzle, (3) is gun barrel of torch for attaching this contact tip, (4) is shielding-gas exhaust nozzle prepared in this gun barrel, (5) is shielding gas for carrying out shield of the weld zone which ejects from this shielding-gas exhaust nozzle, (6) is a filler core wire which passes hole (3a)(2a) prepared in central part of gun barrel (3) and contact tip (2), (7) is welded base material, (8) is welding source linked to gun barrel (3) and welded base material (7), (9) is a driving roller which supplies the above-mentioned filler core wire (6) to torch, (10) is a dc motor which rotates this driving roller, (11) is controlled source of this dc motor (9), (12) is wire reel which wound filler core wire (6) like-coil.

Next, operation is demonstrated.

If switch (not shown) attached to welding torch is pushed, voltage will be impressed between gun barrel (3) and welded base material (7) from welding source, shielding gas (5) will flow from shielding-gas exhaust nozzle (4) simultaneously, and driving roller (9) which rotates by dc motor (10) will supply

filler core wire (6).

It connects by conduit (not shown) between driving roller (9) and gun barrel (3), it passes along inside and supplies filler core wire (6).

Major hole (3a) is opened in gun barrel (3) so that filler core wire (6) can pass easily, in order to make good contact with filler core wire (6), generally hole (2a) slightly more nearly emboldening than filler core wire (6) is opened in contact tip (2).

Since gun barrel (3) and contact tip (2) are fixed with screw, it is this electric potential electrically.

Power supply to filler core wire (6) is performed from contact tip (2) which hole diameter is small and contacts with filler core wire (6).

Generally, by consumable-electrode type gas shielded arc welding, filler core wire (6) is used as anode, and let welded base material (7) is negative plate.

Moreover, as for welding source (8), power source which had the characteristics of constant voltage roughly in respect of weldability is used, filler core wire (6) controls direct flow motor (10) by controlled source (11) to supply at fixed speed.

Although filler core wire (6) with which driving roller (9) supplied at the time of arc starting is short-circuited with welded base material (7) too hastily, since welding source (8) has the characteristics of constant voltage almost, heavy current flows at the time of short circuit, and filler core wire (6) is cut with fuse effect.

At this time, arc carries out ignition between filler core wire (6) and welded base material (7), after it, arc continues and welding is performed.

In spite of developing the welding method which spatter hardly generates during welding like the pulse MIG method in recent years, it is necessary to short-circuit welded base material (7) with filler core wire (6) for arc starting with conventional MIG and MAG etc. consumable-electrode type gas-shielded-arc-welding apparatus.

Filler core wire (6) cut by heavy current at the time of this short circuit, cut part became spatter, and scattered around, and it welded on welded base material (7), and there was disadvantage, such as worsening appearance of bead.

This invention is made in order to remove disadvantage of above conventional things, and it is aimed at providing consumable-electrode type gas-shielded-arc-welding apparatus which can be welded without generating spatter at the time of arc starting.

This invention is equipped with following.

Motor which supplies filler core wire and which can carry out forward/reverse rotation, starting power source of constant current characteristic switched on between the above-mentioned filler core wire and welded base material at the time of arc starting, detector which detects short circuit of the above-mentioned filler core wire and the above-mentioned welded base material, and arc generating, controlled source which the above-mentioned motor is reversed by short-circuit detection of this detector, and is right-rotated by arc generating detection, welding source of constant voltage characteristic switched on by arc generating detection of the above-mentioned detector between the above-mentioned filler core wire and the above-mentioned welded base material.

It is consumable-electrode gas-shielded-arc-welding apparatus characterized by the above-mentioned.

One Example of this invention is demonstrated about figure below.

In FIG. 2, (1)-(12) are the same as that of the above-mentioned thing or corresponding thing is shown.

(13) has constant current characteristic roughly with starting power source of sake at the time of arc starting, and is connected between filler core wire (6) and welded base material (7) juxtaposing welding source (8).

(14) is a detector which is connected between filler core wire (6) and welded base material (7), and detects short circuit between both, and arc generating, and it is comprised so that command may be given to controlled source (11), starting power source (13), and welding source (8) by the detection.

That is, controlled source (11) is comprised so that dc motor (10) may be made in response to command from detector (14) as for normal rotation and reverse rotation, moreover, starting power source (13) and welding source (8) receive command from detector (14), and they are electrically connected so that voltage can be impressed or broken between gun barrel (3) and base material (7).

Next, operation of this invention is demonstrated.

If switch (not shown) of welding torch is pushed, it is the same as conventional apparatus that controlled source (11) is switched on, and dc motor (10) right-rotates, supply filler core wire (6), and shielding gas (5) flows, but in this phase, welding source (8) is not switched on but starting power source (13) is switched on.

Filler core wire (6) is supplied, and even if it short-circuits with welded base material (7) too hastily, since starting power source (13) is constant current characteristic, it flows only through electric current (about 80-100A is suitable) set up beforehand.

For this reason, since heavy current which cuts welding core wire (6) in instant does not flow in accordance with the prior art, cutting of filler core wire (6) by fuse effect does not occur, therefore harmful spatter is not generated, either.

Next, since voltage between gun barrel (3) and welded base material (7) will be set to about 0 V if short circuit takes place, this is detected with detector (14), reverse-rotation command of dc motor (10) is taken out to controlled source (11), and controlled source (11) impresses voltage made to reverse dc motor (10) to dc motor (10) in response to this command.

Therefore, filler core wire (6) is pulled apart from welded base material (7), with electric current from starting power source (13) flowing.

Therefore, arc occurs between front end of filler core wire (6), and welded base material (7).

Detector (14) detects having become appropriate arc voltage (20-30V) at this time, and command is issued, while stopping reverse rotation of dc motor (10), controlled source (11) is operated so that it may right-rotate with fixed filler core-wire rate of feed, and welding source (8) is switched on, and it is made to move to MIG or MAG welding by fixed constant-voltage-characteristic power source.

Since ignition of the arc is already carried out by starting power source (13) at this time, electric current flows from welding source (8) through this arc, and arc is maintained.

After welding-source (8) arc carries out ignition of the starting power source (13), it breaks, and it performs welding by welding source (8) henceforth.

In addition, although the above-mentioned Example demonstrated that starting power source (13) was broken after arc ignition by welding source (8), it is not necessary to necessarily break.

However, it is needless to say that it is necessary to make arc electric current and voltage become appropriate value in this case where electric current is passed also from starting power source.

When performing welding of spray-transfer form with about 100A small electric current using pulse power source and about 10 to 20A is superimposed from starting power source (13) as a base electric current, arc breakage is prevented and effect is in stabilization of arc.

In this case, electric current of starting power source (13) may be made into electric-current value (for example, 80A) required for starting at the time of arc starting, and it may switch after arc starting so that it may become base electric-current value (for example, 10A).

When filler core wire and welded base material short-circuit this invention as demonstrated above, by constant current characteristic power source, after passing short circuit current of small electric current comparatively, filler core-wire supply motor is reversed, filler core wire is pulled apart from welded base material, arc is generated, and, after that, it is made to carry out ignition of the arc of usual MIG or MAG welding from constant-voltage-characteristic power source through the above-mentioned arc.

Therefore, arc can be started without flowing heavy current at the time of short circuit leading to spatter generating, and it is effective in spatter at the time of arc-starting constituting nothing.

If pulse power source is furthermore used as MIG or a MAG welding source, it is effective in beautiful bead which does not have spatter from arc starting to the welding completion being obtained also with about 100A small electric current.

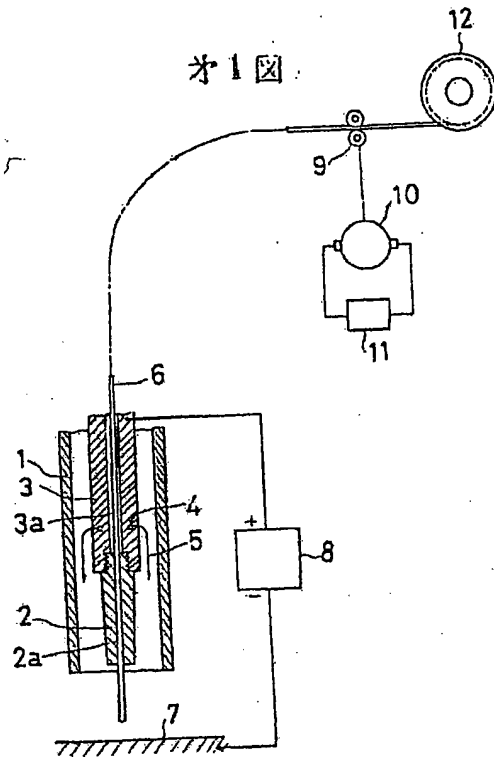
[Brief Description of Drawings] FIG. 1 is connection diagram showing conventional welding apparatus, FIG. 2 is connection diagram showing welding apparatus by one Example of this invention.

(1) is shield nozzle in the figure, (2) is contact tip, (3) is gun barrel, (6) is filler core wire, (7) is welded base material, (8) is welding source, (9) is driving roller, (10) is dc motor, (11) is controlled source, (13) is starting power source, (14) is detector.

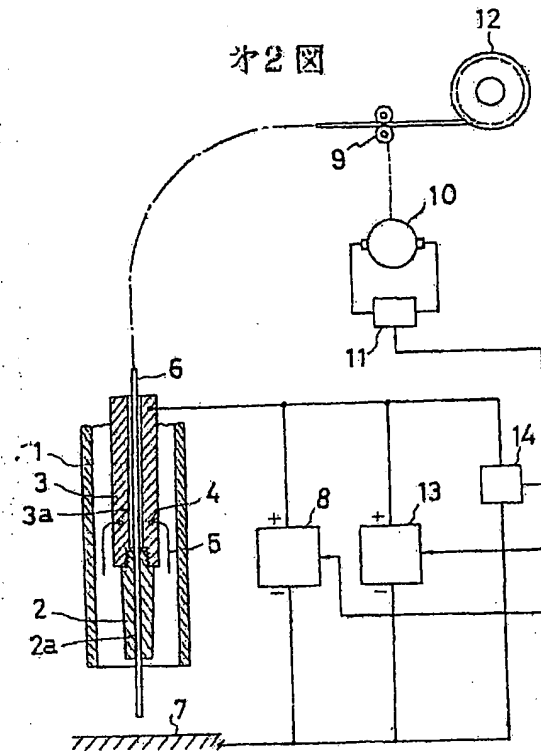
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